

## Strategy – Rumble Strips to Reduce Lane Departure Crashes

Rumble strips are raised or grooved patterns that are placed along paved roadway shoulders to provide both an audible warning (rumbling sound) and a physical vibration. They alert drivers of "drifting" off the road situations that their vehicle is leaving the designated travel lane and a steering correction is required. Rumble strips are intended to alert the motorists before they cross the median or leave the roadway and strike a roadside barrier or hazard. The National Highway Traffic Safety Administration (NHTSA) estimates that drivers who are drowsy or inattentive are a contributing factor in approximately 38% of run off the road (ROR) crashes (NHTSA, 2000). These types of ROR crashes are three to five times more severe than other types of ROR crashes.

The guidelines presently used by the North Carolina Department of Transportation (the Department) specify that rumble strips should be placed on the following types of median divided roadways: Interstate Through Routes, Rural Freeway Segments, and Expressway Segments that are located in sparsely developed rural areas. In an aggressive effort to reduce the number of ROR crashes, the Department is in the process to revising their guidelines to place rumble strips on all median divided Interstates, Freeways and Expressways where access is limited to at grade intersections. The placement of rumble strips shall also be considered for other types of roadway facilities where there is a documented history of lane departure type crashes. Rural median divided roadway with partial control of access will be considered on a case by case basis. The revised guidelines also propose to move the placement of rumble strips to 6" off the edge of travel lane.

### General Description

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#### *Technical Attributes*

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Target	To reduce the number of run off the road crashes by creating an audible and vibratory warning sensation to alert drivers that their vehicle is leaving the designated travel lane and a steering correction is required.
Expected Effectiveness	On high speed median divided Expressways, Freeways and Interstate routes where shoulder rumble strips are added, studies have shown that there is a 20 to 50 percent reduction in single vehicle run off the road crashes.
Keys to Success	<ul style="list-style-type: none"><li>• Adding rumble strips to all high speed median divided Expressways, Freeways and Interstate routes</li><li>• Adding rumble strips should also be considered for other types of roadway facilities where there is a documented history of lane departure type crashes.</li><li>• To allow for the placement of shoulder rumble strips as close as possible to the edge of travel lane.</li></ul>
Potential Difficulties	<p>On existing roadway facilities, the paved shoulder structure may not be adequate to allow for the placement of milled rumble strips.</p> <p>The placement of rumble strips on bike routes will need to be evaluated on a case by case basis.</p>
Appropriate Measures and Data	<ul style="list-style-type: none"><li>• Once installed on an existing roadway facility, monitor the number of reduced run off the road crashes.</li></ul>

- Track the number of hazardous locations where rumble strips are installed.

Associated Needs	Initiate a public awareness campaign to inform the public about the severity of run off the road crashes associated with drivers who are drowsy or inattentive.
Organizational, Institutional, and Policy Issues	Three branches within the Department will coordinate to insure these guidelines are followed. They are the Highway Design Branch, Traffic Engineering and Safety Systems, and Operations.
Issues Affecting Implementation Time	For new construction and rehabilitation projects, shoulder rumble strip programs can be implemented quickly. On existing roadway facilities implementation time may be delayed based upon the availability of funds.
Costs	The costs of adding continuous milled rumble strips to a proposed median divided freeway project on all four shoulders cost approximately \$4000 per roadway mile. While the placement continuous milled rumble strips on an existing freeway will cost approximately \$13,500 per roadway mile. The difference in cost is primarily attributed to the maintenance of traffic during construction.
Training	No special training needs are required.
Legislative Needs	None at this time.